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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/472,300	12/27/1999	STEVE J. SHATTIL	0886285913	8567

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STEVE SHATTIL
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EXAMINER

MOORE, JAMES K

ART UNIT	PAPER NUMBER
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2686

18

DATE MAILED: 11/18/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

KS

Office Action Summary

Application No.

09/472,300

Applicant(s)

SHATTIL, STEVE J.

Examiner

James K Moore

Art Unit

2686

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 August 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-29 is/are pending in the application.
- 4a) Of the above claim(s) 24 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-21 is/are allowed.
- 6) ☒ Claim(s) 22,23 and 25-29 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments, see page 18, paragraph 12, filed August 22, 2003, with respect to claims 1-21 have been fully considered and are persuasive. The rejections of claims 1-21 have been withdrawn.

2. Applicant's arguments with respect to claim 22 have been fully considered but they are not persuasive.

In regards to claim 22, the Applicant argues that Laasko fails to disclose reception of a plurality of transmission signals by a plurality of receiver elements. See page 20, paragraph 19. However, this argument is unpersuasive because Laasko's parallel multi-stage receiver includes parallel filters 41a-41c which receive a plurality of transmission signals and provide a plurality of received signals. See Figure 4 and col. 5, line 42 – col. 6, line 3.

3. Applicant's arguments with respect to claims 23 and 25-29 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 102

4. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

5. Claim 22 is rejected under 35 U.S.C. 102(e) as being anticipated by Laasko et al. (U.S. Patent No. 5,898,740).

Regarding claim 22, Laasko discloses a method of optimizing separation of a plurality of transmitted signals received by a plurality of receiver elements (filters 41a-41c) coupled to a cancellation circuit. The method includes receiving a plurality of transmission signals transmitted in a common frequency channel by the receiver elements for providing a plurality of received signals. The received signals have co-channel interference. The method also includes providing a determination of signal quality (signal-to-interference ratio) for separated signals output by the cancellation circuit, providing feedback signals (power control signals) to transmitters (11-14) that generate the transmission signals, and adjusting transmission parameters (power levels) to provide adjustment to the co-channel interference of received signals. The adjustment of the transmission parameters is related to the values of the feedback signals. See Figures 1 and 4; col. 3, lines 15-57; and col. 5, line 42 through col. 6, line 51.

Claim Rejections - 35 USC § 103

6. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Martin (U.S. Patent No. 5,875,216) in view of Hageltorn et al. (U.S. Patent No. 6,006,117).

Regarding claim 23, Martin discloses a method of separating received transmission signals ($u(t)$) transmitted by transmitters, the received transmission signals having known ratios of co-channel interference. The method includes receiving the

Art Unit: 2686

transmission signals with a plurality of receivers which provide a plurality of received signals having known ratios of co-channel interference, providing weights ($w_1(k)$ to $w_M(k)$) to a cancellation circuit (20,24) based on the ratios of co-channel interference, and coupling the received signals into the cancellation circuit which separates the received transmission signals. See Abstract and col. 3, lines 8-32. Martin does not disclose that the transmitters have a plurality of transmitter elements.

Hageltorn discloses a transmitter (a radiotelephone) which has a plurality of transmitter elements (antennas 1 and 2). One element is used in a stand-by mode, and another element is used during calls. Hageltorn teaches that this antenna configuration provides high performance during ongoing calls as well as in stand-by mode. See Abstract and col. 3, lines 14-33. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Martin with Hageltorn, such that the transmitters have a plurality of transmitter elements, in order to provide high performance during ongoing calls as well as in stand-by mode.

7. Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Barratt et al. (U.S. Patent No. 5,592,490) in view of Hageltorn et al.

Regarding claim 25, Barratt discloses a signal canceller that separates transmission signals from a plurality of interfering transmission signals transmitted by transmitters and received by a receiver (16) having a plurality of receiver elements, the signal canceller coupled to the receiver. The signal canceller includes a frequency filter coupled to the receiver which receives a plurality of the received transmission signals.

Art Unit: 2686

Each of the received signals has an algebraically unique combination of the transmission signals and each of the transmission signals has distributed frequency characteristics. The frequency filter separates each of the received signals into a plurality of received-signal frequency components. The signal canceller also includes a plurality of weighting elements (22) coupled to the frequency filter. The weighting elements provide a weight to each of the received-signal frequency components to provide a plurality of weighted received-signal frequency components. The signal canceller also includes a signal combiner (21) which sums the weighted received-signal frequency components to separate the received transmission signals. See Abstract; Figures 1 and 3; col. 3, lines 38-59; col. 6, line 55 through col. 7, line 17; and col. 8, lines 9-35. Barratt does not disclose that the transmitters have a plurality of transmitter elements.

Hageltorn discloses a transmitter (a radiotelephone) which has a plurality of transmitter elements (antennas 1 and 2). One element is used in a stand-by mode, and another element is used during calls. Hageltorn teaches that this antenna configuration provides high performance during ongoing calls as well as in stand-by mode. See Abstract and col. 3, lines 14-33. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Barratt with Hageltorn, such that the transmitters have a plurality of transmitter elements, in order to provide high performance during ongoing calls as well as in stand-by mode.

Art Unit: 2686

8. Claims 26-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Roy, III et al. (U.S. Patent No. 5,515,378) in view of Hageltorn et al.

Regarding claim 26, Roy discloses a signal canceller (Spatial Demultiplexer 120) which separates one or more transmission signals (s_1, s_2, s_3) from a plurality of interfering transmissions signals transmitted by transmitters and received by a receiver having a plurality of receiver elements. The signal canceller includes a plurality of weighting elements coupled to the receiver which receive a plurality of receive signals ($x_r(t)$ - 112,114,116) from the receiver. Each of the receive signals has an algebraically unique combination of the transmission signals. The weighting elements provide weights ($w_r(\theta_k)$) to each of the receive signals to provide a plurality of weighted receive signals. The signal canceller also includes a signal combiner which sums the weighted receive signal to separate the interfering transmission signals. See Figures 4 and 7; col. 13, line 25 through col. 14, line 10; col. 20, lines 5-20; col. 21, lines 44-57; and col. 24, lines 1-9. Roy does not disclose that the transmitters have a plurality of transmitter elements.

Hageltorn discloses a transmitter (a radiotelephone) which has a plurality of transmitter elements (antennas 1 and 2). One element is used in a stand-by mode, and another element is used during calls. Hageltorn teaches that this antenna configuration provides high performance during ongoing calls as well as in stand-by mode. See Abstract and col. 3, lines 14-33. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Roy with Hageltorn, such that the

Art Unit: 2686

transmitters have a plurality of transmitter elements, in order to provide high performance during ongoing calls as well as in stand-by mode.

Regarding claim 27, Roy discloses a receiver which separates a plurality of received transmission signals (s_1, s_2, s_3) transmitted by transmitters. The receiver includes a plurality of receiver elements (multichannel receivers 102, 104, 106) which sample the transmission signals. The receiver elements are responsive to the transmission signals for generating a plurality of receive signals (112, 114, 116), where each of the receive signals includes an algebraically unique combination of the transmissions signals. The receiver also includes a canceller (SDMAP/Spatial Demultiplexer 120) coupled to the receiver elements which separates the received transmission signals. See Figures 4 and 7; col. 13, line 25 through col. 14, line 10; col. 20, lines 5-20; and col. 21, lines 44-57. Roy does not disclose that the transmitters have a plurality of transmitter elements.

Hageltorn discloses a transmitter (a radiotelephone) which has a plurality of transmitter elements (antennas 1 and 2). One element is used in a stand-by mode, and another element is used during calls. Hageltorn teaches that this antenna configuration provides high performance during ongoing calls as well as in stand-by mode. See Abstract and col. 3, lines 14-33. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Roy with Hageltorn, such that the transmitters have a plurality of transmitter elements, in order to provide high performance during ongoing calls as well as in stand-by mode.

Regarding claim 28, Roy in view of Hageltorn teaches all of the limitations of claim 27, and Roy also discloses that the plurality of receiver element is an antenna array that includes a plurality of antenna-array beam processors, and that the receive signals are output from each of the processors. See Figure 7 and col. 13, lines 44-62.

9. Claim 29 is rejected under 35 U.S.C. 103(a) as being unpatentable over Roy, III et al. in view of DiFonzo (U.S. Patent No. 3,963,990).

Regarding claim 29, Roy discloses a receiver which receives a plurality of algebraically unique proportions of more than two transmission signals (s_1, s_2, s_3) to separate the received transmission signals. The receiver includes a plurality of receiver elements (multichannel receivers 102,104,106). Each of the receiver elements has a different responsiveness to the transmission signals for generating a plurality of receive signals (112,114,116), where each of the receive signals includes an algebraically unique combination of the transmission signals. The receiver also includes a canceller (SDMAP/Spatial Demultiplexer 120) coupled to the receiver elements which separates the received transmission signals. See Figures 4 and 7; col. 13, line 25 through col. 14, line 10; col. 20, lines 5-20; and col. 21, lines 44-57. Roy does not disclose that the transmission signals are differently polarized, or that the receiver elements are polarized.

DiFonzo discloses a communication system comprising a receiver which has a plurality of polarized receiver elements capable of having different polarization and which is capable of receiving more than two differently polarized transmission signals.

Art Unit: 2686

The receiver configuration increases the bandwidth of the communication system. See col. 1, line 14 through col. 2, line 11, and col. 8, line 40 through col. 9, line 15. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Roy with DiFonzo, such that the transmission signals are differently polarized, and that the receiver elements are polarized, in order to increase the bandwidth of the communication system.

Allowable Subject Matter

10. Claims 1-21 are allowed.

Conclusion

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

Art Unit: 2686

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ken Moore, whose telephone number is (703) 308-6042. The examiner can normally be reached on Monday-Friday from 8:30 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marsha Banks-Harold, can be reached at (703) 305-4379.

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

Washington, D.C. 20231

or faxed to:

(703) 872-9314 (for Technology Center 2600 only)

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA, Sixth Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 Customer Service Office whose telephone number is (703) 306-0377.

Ken Moore

11/13/03

JKM

Marsha D Banks-Harold

MARSHA D. BANKS-HAROLD
SUPERVISORY PATENT EXAMINER
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